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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/698,040	10/30/2003	David Hait	5013.005	1172
7590 01/13/2010 PEARL COHEN ZWDEK LATZER 12th Floor 1500 Broadway New York, NY 10036				
EXAMINER SEE, CAROL A				
ART UNIT		PAPER NUMBER		
3696				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/698,040

**Applicant(s)**

HAIT, DAVID

**Examiner**

Carol See

**Art Unit**

3696

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 September 2009.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-25 is/are pending in the application.  
4a) Of the above claim(s) 1-9 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 10-25 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO/SI/225)  
4) ☐ Interview Summary (PTO-413)  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_  
Paper No(s)/Mail Date \_\_\_\_\_

### **DETAILED ACTION**

#### **Response to Amendment**

1. Examiner acknowledges Applicant's Arguments/Remarks, submitted 9/14/2009, which have cancelled claims 1-9 and added new claims 10-25.
2. Applicant's cancellation of claims 1-9 renders moot previous objections, rejections and arguments (regarding priority), which are hereby withdrawn.
3. Claims 10-25 are currently pending in this action.

#### **Response to Arguments**

4. Applicant's arguments filed 9/14/2009 have been fully considered, but cancellation of claims 1-9 has rendered the arguments moot.
5. In response to Applicant's arguments (pg. 6), the following language has been deleted from previous rejection under 35 USC 112, 2<sup>nd</sup> paragraph – "For example, although applicant refers to node vega as an exact derivative, applicant represents the term in equation form (Equation 6) as a partial derivative."

#### ***Claim Objections***

6. Claims 11-13 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Independent claim 10, from

which claims 11-13 depend, recites a machine. The value for node vega and the identification of a security fail to further narrow the scope of the claimed machine.

***Claim Rejections - 35 USC § 112***

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 10 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 11-16 and 24 are rejected as depending from claim 10. Claims 18-23 and 25 are rejected as depending from claim 17.

Re claims 10 and 17: it is unclear as to the meaning of "using a function of the values for node vega computed at the node" and "using a function of the value of vega computed for the binomial tree." What are these functions?

Further, re claims 24 and 25: it is unclear as to the meaning of "using a recursive function of the values for node vega computed at the nodes." What is this function?

Further, re claim 12: applicant states value of node vega at "each" node is the security price when option is exercised. It is unclear how a value at "each node" can be this value, when exercise is at a single node.

***Claim Rejections - 35 USC § 101***

9. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

10. Claim 17 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 18-23 and 25 are rejected as depending from claim 17.

Based on Supreme Court precedent a method claim must (1) be tied to another statutory class of invention (such as a particular apparatus) or (2) transform underlying subject matter (such as an article or materials) to a different state or thing (see at least *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876)). A method claim that fails to meet one of the above requirements is not in compliance with the statutory requirements of 35 U.S.C. 101 for patent eligible subject matter. Here claim 17 fails to meet the above requirements since there is not a sufficient tie to another statutory class. Claims 18-23 and 25 are rejected as depending from claim 17.

***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. 1 - 9 (Canceled)

13. Claims 10, 14, 15, 17, 21, 22, 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Widdicks (On the Enhanced Convergence...Option Pricing, 2002).

Re claim 10 (New): Widdicks shows a machine comprising:

a computing device (pg. 336-337, referencing computational time and program code, indicating a computing device that runs with this programming code) for determining an implied volatility of an American option that can be exercised prior to the time when the option expires, wherein said device is configured to:

generate a binomial tree having a plurality of nodes, each node corresponding to a different sub-period of time during which the American option can be exercised prior to the time when the option expires (pgs. 332-333, 336-337, fig. 2 showing generating binomial tree);

compute a value for node vega at each node of the binomial tree for the corresponding sub-period of time (pg. 336-337, showing computation of Greeks using binomial tree);

compute a value for node vega at each node of the binomial tree for the corresponding sub-period of time (pgs. 336-337)

compute a value for vega for the binomial tree using a function of the values for node vega computed at the nodes (pgs. 336-337).

compute a value for the implied volatility of the American option using a function of the value of vega computed for the binomial tree (pgs. 326-7, 336-7).

As Widdicks indicates that binomial tree method can also produce a value for the Greeks – including vega and for calculation of implied volatility – it would have been obvious to one of ordinary skill in the art to have incorporated calculation of vega and implied volatility in to the machine configuration of Widdicks in order to incorporate all necessary and valid parameters in accurate options pricing.

The recitation “for determining an implied volatility of an American option that can be exercised prior to the time when the option expires” constitutes a statement of intended use and is not afforded patentable weight.

Re claim 14 (New): Widdicks shows the machine of Claim 10. Widdicks further shows wherein said computing device is configured to calculate the implied volatility of the American option reiteratively using new values for node vega in each iteration until the computed price of the American option converges to the market price of the American option (pg. 326-7, showing vega requires two lattices with different values of interest, which indicates different values for node vega, and a technique that is repeated). Alternatively, Examiner notes that it is well known in the art that use of binomial trees is an iterative technique.

Re claim 15 (New): Widdicks shows the machine of claim 14. Widdicks further shows wherein said computing device is configured to calculate the new values for node vega in each iteration using the Newton-Raphson method (pg. 327). Alternatively, Examiner notes that Newton-Raphson method is a numerical optimization technique well known in the art.

Re claim 24 (New): Widdicks shows the machine of claim 10. Widdicks further shows wherein said machine is configured to compute a value for vega for the binomial tree using a recursive function of the values for node vega computed at the nodes (pg. 333-337).

The limitations of claims 17, 21, 22 and 25 parallel the limitations of claims 10, 14, 15 and 24, and are therefore rejected under the same rationale.

14. Claims 11-13, 16, 18-20 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Widdicks in view of Breen (The Accelerated Binomial Option Pricing Model, 1991).

Re claim 11 (New): Widdicks shows the machine of claim 10. Widdicks does not expressly show wherein the value for node vega at each node is the exact derivative of the option price with respect to the volatility when the option is not exercised at the sub- period of time corresponding to the node. Breen shows wherein the value for node vega at each node is the exact derivative of the option price with respect to the volatility when the option is not exercised at the sub- period of time corresponding to the node (pg. 154, 156-8, showing for American options, determining holding – i.e., non-exercise value at each node). Widdicks and Breen are directed to methods of analyzing options. It would have



been obvious to one of ordinary skill in the art at the time of Applicant's invention to have incorporated into the configuration to calculate option pricing parameters, of Widdicks, the ability to determine option exercise prices, shown in Breen, in order to assist a user to determine a beneficial time to exercise or to continue to hold an option.

Re claim 12 (New): Widdicks shows the machine of Claim 10; however does not expressly show wherein the value for node vega at each node is the security price of the option when the option is exercised at a sub-period of time corresponding to the node. Breen shows wherein the value for node vega at each node is the security price of the option when the option is exercised at a sub-period of time corresponding to the node (pg. 154, 156-8, showing for American options, determining exercise value at each node). Widdicks and Breen are directed to methods of analyzing options. It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to have incorporated into the configuration to calculate option pricing parameters, of Widdicks, the ability to determine option exercise prices, shown in Breen, in order to assist a user to determine a beneficial time to exercise or to continue to hold an option.

Re claim 13 (New): Widdicks in view of Breen shows the machine of claim 12. Widdicks further shows wherein the security is an index (pg. 316, showing binomial tree applicable across a wide range of options, which broad category encompasses an index).

Re claim 16 (New): Widdicks shows the machine of claim 10. Widdicks further shows wherein said computing device is configured to calculate vega at subperiods of time (pg. 336-7, showing calculation using binomial tree). Breen further shows wherein said computing device is configured to calculate the price of the option at each node (pg. 154,

156-8, showing for American options, determining holding – i.e., non-exercise value at each node and showing determining exercise value at each node). Examiner notes that, as Widdicks shows calculation of vega and option prices using binomial tree, it would have been obvious to one of ordinary skill in the art to recognize that the programming parameters could be made to perform calculations in any order or at any time desired by the user.

The limitations of claims 18-20 and 23 parallel the limitations of claims 11-13 and 16 above, and are therefore rejected under the same rationale.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carol See whose telephone number is (571)272-9742. The examiner can normally be reached on Monday - Thursday 6:45 am - 5:15 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stefanos Karmis, can be reached on (571) 272-6744. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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